Context Dependency of Serum and Urinary Lithium: Implications for Measurement of Proximal Sodium Reabsorption

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Hypertension 2007;49;34-; originally published online Mar 26, 2007;
DOI: 10.1161/HYPERTENSIONAHA.107.089862
Hypertension is published by the American Heart Association. 7272 Greenville Avenue, Dallas, TX 72514
 Print ISSN: 0194-911X. Online ISSN: 1524-4563

Letter to the Editor

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To the Editor:

As reported previously in this journal, the endogenous lithium clearance is a marker of proximal tubular sodium handling.[1,2] To investigate the context dependency of the endogenous lithium clearance, we measured by electrothermal atomic absorption spectrophotometry the lithium concentrations in serum and in exactly timed urine samples in 745 whites (51.5% women) and 266 blacks (62.8%) who were recruited randomly from the population in Belgium[1] and South Africa.[3] Mean age (±SD) was 40.6±15.8 and 42.6±18.2 years, respectively. The average (±SD) concentration of lithium in tap water (1.37±0.56 versus 0.03±0.01 μmol/L) and the 24-hour urinary lithium excretion (8.2±5.6 versus 3.1±4.1 μmol per 24 hours) were higher and more dispersed in Belgium than in South Africa ($P<0.0001$ for differences in means and variances; Figure). These results strongly suggest that the environment, probably via the food chain,[4] determines the dietary intake of lithium. By contrast, the serum lithium distributions (0.31±0.16 versus 0.32±0.21 μmol/L) were very similar in means ($P=0.58$) but not in variances ($P<0.0001$). These observations suggest that serum lithium is tightly regulated despite large variations in dietary intake. The rank correlations (±SE) between the lithium and creatinine clearances (0.44±0.04 versus 0.42±0.06; $P=0.70$ for between-country difference) and between the serum and urinary lithium concentrations (0.30±0.04 versus 0.22±0.06; $P=0.26$) were similar across countries. The latter observation suggests that the endogenous lithium clearance, whether expressed as clearance or as fractional excretion, remains a useful marker of proximal sodium reabsorption under various environmental conditions.

Sources of Funding

The study was financed in part by InGenious HyperCare (LSHM-CT-2006-037093), a grant of the European Union.

Disclosures

None.

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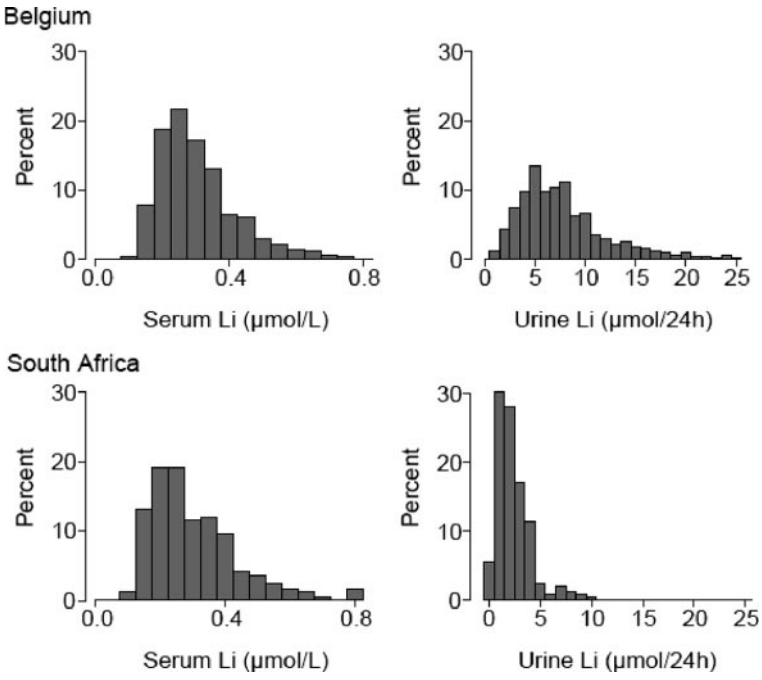

Distributions of serum and urinary lithium. Outlier values were removed.

(*Hypertension*. **2007;49:e34-e35.**)

Hypertension **is available at http://www.hypertensionaha.org** **DOI: 10.1161/HYPERTENSIONAHA.107.089862**

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1. Seidlerova J, Staessen JA, Maillard M, Nawrot T, Zhang H, Bochud M, Kuznetsova T, Richart T, Van Bortel LM, Struijker-Boudier HA, Manunta P, Burnier M, Fagard R, Filipovsky J. Association between arterial properties and renal sodium handling in a general population. *Hypertension.* 2006;48:609–615.
2. Eap CB, Bochud M, Elston RC, Bovet P, Maillard M, Nussberger J, Schild L, Shamlaye C, Burnier M. *CYP3A5* and *ABCB1* genes influence blood pressure and response to treatment, and their effect is modified by salt. *Hypertension.* 2007;49:1007–1014.
3. Shiburi CP, Staessen JA, Maseko M, Wojciechowska W, Thijs L, Van Bortel LM, Woodiwiss AJ, Norton GR. Reference values for SphygmoCor measurements in South Africans of African ancestry. *Am J Hypertens*. 2006;19:40–46.
4. Schrauzer GN. Lithium: occurrence, dietary intakes, nutritional essentiality. *J Am Coll Nutr*. 2002;21:14–21.